CLAIMS

1. A method for calculating a future cost for use in routing an integrated circuit, the conductors in the integrated circuit being modeled by a plurality of nodes and at least one source node, the method comprising:

obtaining a first node from the plurality of nodes;

obtaining a second node that can be electrically connected to the first node;

determining a cumulative routing cost of the second node;

calculating a first distance between the second node and the source node; and

setting the future cost equal to the cumulative routing cost if there is no existing future cost that corresponds to the distance or if the cumulative routing cost is less than the existing future cost corresponding to the distance.

2. The method of claim 1 wherein the first distance is a Manhattan distance.

3. The method of claim 1 wherein the cumulative routing cost of the second node comprises a cumulative routing cost of the first node and a routing cost of the second node.

4. The method of claim 1 wherein the first node is a source node.

5. The method of claim 4 wherein the source node is located at one corner of the integrated circuit.

6. The method of claim 1 wherein first distance is less than a predetermined value.

7. The method of claim 6 further comprising the step of calculating a first cost slope using the cumulative routing cost and the first distance.

8. The method of claim 7 further comprising:

providing a memory location for storing a cost slope value;

recording the first cost slope in the memory location if the first cost slope is smaller than the cost slope value stored in the memory location or if there is no existing cost slope value in the memory location.

9. The method of claim 1 further comprising:

generating a two dimensional array;

calculating a second distance between the second node and the source node, the second distance being in an orientation substantially perpendicular to the first distance; and

storing the future cost in a position of the array determined by the first and the second distances.

10. The method of claim 9 wherein the first and the second distances are Manhattan distances.

11. The method of claim 9 wherein the cumulative routing cost of the second node comprises a cumulative routing cost of the first node and a routing cost of the second node.

12. The method of claim 9 wherein the first and the second distances are less than predetermined values.

13. The method of claim 12 further comprising the step of calculating a first cost slope using the cumulative routing cost and the first distance and calculating a second cost slope using the cumulative routing cost and the second distance.

14. The method of claim 13 further comprising:

providing a first memory location for storing a first value and a second memory location for storing a second value;

recording the first cost slope in the first memory location if the first cost slope is smaller than the first value in the location; and

recording the second cost slope in the second memory location if the second cost slope is smaller than the second value in the location.

15. The method of claim 9 wherein the array is stored in a memory device, and the array is later retrieved from the memory device to perform the routing.

16. A method for calculating a future cost for use in routing an integrated circuit, the conductors in the integrated circuit being modeled by a plurality of nodes, the method comprising:

creating a queue;

placing a source node into the queue; and

performing the following steps until the queue is empty:

selecting a low cost node from the queue, the low cost node having lowest cumulative routing cost of all nodes in the queue;

obtaining a neighboring node that can be electrically connected to the low cost node and is unvisited;

determining a cumulative routing cost of the neighboring node;

calculating a first distance between the neighboring node and the source node;

adding the neighboring node to the queue;

setting the future cost equal to the cumulative routing cost if there is no existing future cost that

corresponds to the first distance or if the cumulative routing cost is less than the existing future cost; and

repeating the obtaining, determining, calculating, adding and setting steps until substantially all unvisited nodes neighboring the low cost node have been considered.

17. The method of claim 16 wherein the first distance is a Manhattan distance.

18. The method of claim 16 wherein the cumulative routing cost of the neighboring node comprises a cumulative routing cost of the low cost node and a routing cost of the neighboring node.

19. The method of claim 16 wherein first distance is less than a predetermined value.

20. The method of claim 19 further comprising the step of calculating a first cost slope using the cumulative routing cost and the first distance.

21. The method of claim 20 further comprising:

providing a memory location for storing a cost slope value;

recording the first cost slope in the memory location if the first cost slope is smaller than the cost slope value stored in the memory location.

22. The method of claim 21 further comprising:

generating a two dimensional array;

calculating a second distance between the neighboring node and the source node, the second distance being in an orientation substantially perpendicular to the first distance; and

storing the future cost in a position of the array determined by the first and the second distances.

23. The method of claim 22 wherein the first and the second distances are Manhattan distances.

24. The method of claim 22 wherein the first and the second distances are less than predetermined values.

25. The method of claim 24 further comprising the step of calculating a first cost slope using the cumulative routing cost and the first distance and calculating a second cost slope using the cumulative routing cost and the second distance.

26. The method of claim 25 further comprising:

providing a first memory location for storing a first value and a second memory location for storing a second value;

recording the first cost slope in the first memory location if the first cost slope is smaller than the first value in the location; and

recording the second cost slope in the second memory location if the second cost slope is smaller than the second value in the location.

27. The method of claim 22 wherein the array is stored in a memory device, and the array is later retrieved from the memory device to perform the routing.

28. A method for routing signals in an integrated circuit, the integrated circuit being modeled by a plurality of nodes, the method comprising:

generating an array;

calculating a plurality of future costs and a plurality of associated distances, each of the distances being less than a predetermined value;

storing the plurality of future costs in separate places in the array based on their associated distances;

determining a cost slope using the plurality of future costs and the associated distances;

performing routing using a cost that includes the plurality of future costs if a distance from a node to a target node is less than the predetermined value and values calculating from the cost slope otherwise.

29. The method of claim 28 wherein the plurality of distances are Manhattan distances.